

Express Mail No.: **EL656358033US**Date: **December 22, 2000**

I hereby certify that this correspondence is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

ANTONELLA FUSILLO

(Name of person mailing paper or fee)

(Signature)

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371Attorney's Docket No:
WELLISCH

INTERNATIONAL APPLICATION NO.

PCT/DE99/01772

INTERNATIONAL FILING DATE

June 16, 1999

PRIORITY DATE CLAIMED

June 29, 1998

TITLE OF INVENTION

ELECTRIC MOTOR

APPLICANT(S) FOR DO/EO/US

ERNST WELLISCH

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ Original or facsimile of an oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. concern other document(s) or information included:

1. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Search Report and Form PTO-1449

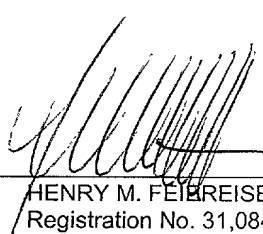
U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 097720520		INTERNATIONAL APPLICATION NO. PCT/DE99/01772	ATTORNEY'S DOCKET NO. WELLISCH
17. <input checked="" type="checkbox"/> The following fees are submitted : BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):			
<input checked="" type="checkbox"/> For filing with EPO or JPO search report (37 C.F.R. 1.492(a)(5))			\$ 860.00
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(1))			\$ 690.00
<input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(2)) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))			\$ 710.00
<input type="checkbox"/> Neither international preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(3)) nor international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))			\$1,000.00
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 C.F.R. 1.492(a)(4)) and all claims satisfied provisions of PCT Articles 33(2)-33(4)			\$ 100.00
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).			
Claims	Number Field	Rate	
Total Claims	4-20	x \$ 18.00	
Independent Claims	1-3	x \$ 80.00	
Multiple dependent claims (if applicable)		x \$270.00	
TOTAL OF ABOVE CALCULATIONS			\$860.00
<input type="checkbox"/> Applicant claims small entity status pursuant to 37 C.F.R. 1.27. Reduction by 1/2 for filing by small entity.			
SUBTOTAL			\$860.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date 37 CFR 1.492(f).			
TOTAL NATIONAL FEE			\$860.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +			\$ 40.00
TOTAL FEES ENCLOSED			\$900.00
Amount to be refunded			
charged			

- a. ☒ A check in the amount of **\$900.00** to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. **06-0502** in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **06-0502**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.

Send all correspondence to:

HENRY M. FEIEREISEN
 350 Fifth Avenue
 Suite 3220
 New York, N.Y. 10118
 (212) 244-5500
 Date: December 22, 2000


 HENRY M. FEIEREISEN
 Registration No. 31,084

09/720520

PATENT

528 Rec'd PCT/PTO 22 DEC 2000

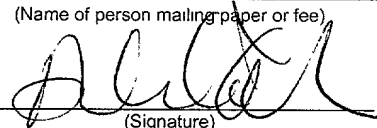
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Docket No.: WELLISCH

In re Application of:)
ERNST WELLISCH)
Int. Appl. No.: PCT/DE99/01772)
Int. Filing Date: June 16, 1999)
For: ELECTRIC MOTOR)

FIRST PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Express Mail mailing label number: EL656358033US
Date of Deposit: December 22, 2000
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.
ANTONELLA FUSILLO
(Name of person mailing paper or fee)

(Signature)

S I R:

Preliminary to the first Official Action in the above-entitled application,
please amend the application as follows:

CLEAN VERSION OF AMENDED CLAIMS:

4. (Amended) Electric motor according to claim 1, characterized in that the electric motor is a high-speed, heavy-duty asynchronous motor.

VERSION WITH MARKINGS TO SHOW CHANGES MADE:

IN THE SPECIFICATION:

Page 1, before the title, delete "Description".

Before paragraph [0001], add --BACKGROUND OF THE INVENTION--.

Before paragraph [0004], add the heading --SUMMARY OF THE INVENTION--.

Before paragraph [0010], add the heading --BRIEF DESCRIPTION OF THE
DRAWING--.

Before paragraph [0016], add the heading --DETAILED DESCRIPTION OF
PREFERRED EMBODIMENTS--.

Page 6, after the heading "CLAIMS" and before the first claim add --What is
claimed is:--.

IN THE CLAIMS:

Amend the following claims:

Claim 4, line 1, change "one of the preceding claims " to --claim 1--.

REMARKS

This Amendment is submitted preliminary to the issuance of an Office Action in the present application.

Applicant has amended claim 4 to remove any multiple dependency of the claim. In addition, applicant has amended the specification to present it with proper headings.

When the Examiner takes this application up for action, he is requested to take the foregoing into account.

The Commissioner is hereby authorized to charge fees which may be required, or credit any overpayment to Deposit Account No. 06-0502.

Respectfully submitted,

By: 

Henry M. Feiereisen
Agent for Applicant
Reg. No. 31,084

Date: December 22, 2000
350 Fifth Avenue
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New York, N.Y. 10118
(212) 244-5500
HMF:af

Description

ELECTRIC MOTOR

[0001] The invention relates to an electric motor including a stator and a rotor which includes at least a stack of laminations layered by sheets and provided with slots for receiving rotor windings.

[0002] German Pat. No. DE 1 107 804 discloses an electric machine in which the dampening cage of the armature includes poles or pole shoes and is made through dead-mold casting, permanent mold casting or die casting. The short-circuit rings are configured as prolonged pole tips which support the winding, disposed on the pole shank, on the end faces of the pole iron as protection against a deformation or destruction through centrifugal forces, and extend into the space between two neighboring pole windings. Hereby, the high centrifugal forces of the armature are only partly absorbed.

[0003] Moreover, it is known, to fabricate the stack of laminations of the armature with end sheets of structural steel or compression rings. The end sheets are configured in the slot area as pressure fingers to effect an axial support. There is no radial force-fitting engagement between end sheet and the short circuit bars in the slot area. The support effect at the bar end must be assumed by the electric sheet. The slots of the electric sheet for receiving the

rotor bars are provided with a leakage orifice which is open toward the outer diameter of the sheet. During operation, the rotor bars are pushed by the centrifugal forces to the outside and supported in the area of the leakage orifice at the rod end of the stack of laminations. At this location, the yield point and the strength of the electric sheet restrict a higher operational speed.

[0004] It is therefore an object of the invention to provide an electric motor having a rotor configured for high speeds while ensuring a high operational safety.

[0005] The posed object is attained by providing at the end face of at least one stack of laminations at least one rotor end sheet which is made of high-strength fine-grain structural steel and exhibits, at least in proximity of the rotor axis, the geometric shape of the sheets layered in the stack of laminations.

[0006] These rotor end sheets of high-strength fine-grain structural steel may be made through laser cutting, water-jet cutting or other suitable cutting processes and exhibit a high yield point and strength (770 to 980 Nm/mm²). Thus, material stress during operation at high speeds can be durably coped with. The fatigue strength of these materials ranges for the stated strength zone at 310 to 400 Nm/mm².

[0007] The rotor end sheets are shrunk or pressed onto the finished or unfinished rotor shaft.

[0008] In accordance with a further embodiment, the leakage orifices of the rotor end sheets are closed so as to realize a further compaction and thus an increase in the yield point of the electric sheets. Radial forces, applied in particular by the winding head at high speeds can be better absorbed in this manner. In addition, the winding or the winding heads are supported hereby at less stress to the material in the area of the electric sheets. As a consequence of arranging at least some leakage orifices in the rotor end sheet, the electromagnetic properties can be enhanced. By a preferred enlargement of the cross section in the area that is subject to high strain, material stress can be further reduced.

[0009] Apart from the rotor end sheets of the individual stacks of laminations, also electric sheets or partial stacks of laminations, positioned axially further inwardly, form a closed leakage orifice and thereby contribute to a further support of the winding and the winding heads, without adversely affecting the electromagnetic properties of the armature.

[0010] The invention as well as further advantageous configurations of the invention according to the features set forth in the subclaims will now be

described in more detail with reference to exemplified embodiments illustrated schematically in the drawing, in which:

[0011] FIG. 1 shows an axial section of a rotor of this type;

[0012] FIG. 2 shows a cross section of a rotor end sheet;

[0013] FIG. 3 is a cross section of a further rotor end sheet;

[0014] FIG. 4 is a cutaway view of a rotor end sheet with closed leakage orifice;

[0015] FIG. 5 is a cutaway view of a rotor end sheet with open leakage orifice.

[0016] FIG. 1 shows a rotor shaft 1 on which a stack of laminations 2 is shrunk or pressed and has on its respective end faces 3, 4 rotor end sheets 5. The rotor end sheets 5 have axial openings 6. These openings 6 correspond to the openings of the stack of laminations 2. These openings 6 serve substantially to provide an axis-parallel supply of cooling air. Diecast rings 7 are positioned at the respective end faces 3, 4 of the rotor end sheets 5 for axial securement of the stack of laminations 2, and are also provided with openings 8 for passage of the stream of cooling air.

[0017] FIGS. 2, 3 show a cross section of half of such a rotor end sheet 5, including the openings 6 for the cooling air stream and the slots 8 located at the outer perimeter for accommodation of the rotor windings or bars, not shown in more detail.

[0018] According to FIGS. 4, 5, the slots 8 have hereby an open leakage orifice 9 or a closed leakage orifice 10. The closed leakage orifices 10 have the advantage of contributing to a further increase of the yield point at high speeds of the motor. In contrast thereto, the open leakage orifices 9 have better electromagnetic properties.

[0019] At operation of an electric motor, not shown in more detail, the centrifugal forces act primarily upon the rotor end sheets 5 which are made of high-strength fine-grain structural steel, so that the slots 8 of the stack of laminations 2 are relieved. The winding heads as well as the windings themselves are supported essentially by the rotor end sheets 5. Such rotor end sheets 5 are mainly produced through a cutting process, such as water-jet cutting or laser cutting. Of course, other cutting processes or punching processes are also suitable in this context.

CLAIMS

1. Electric motor including a stator and a rotor which includes at least a stack of laminations (2) layered by sheets and provided with slots (8) for receiving rotor windings, characterized in that at the end face (3, 4) of at least one stack of laminations (2) at least one rotor end sheet (5) is provided which is made of high-strength fine-grain structural steel and exhibits, at least in proximity of the rotor axis, the geometric shape of the sheets layered in the stack of laminations (2).
2. Electric motor according to claim 1, characterized in that the slots (8) of the rotor end sheet (5) are closed.
3. Electric motor according to claim 1, characterized in that the slots (8) of the rotor end sheet (5) have, at least some, leakage orifices (9).
4. Electric motor according to one of the preceding claims, characterized in that the electric motor is a high-speed, heavy-duty asynchronous motor.

ABSTRACT

Electric Motor

In an electric motor with a stator and a rotor which includes at least a stack of laminations (2) layered by sheets and provided with slots (8) for receiving rotor windings, at the end face (3, 4) of at least one stack of laminations (2) at least one rotor end sheet (5) is provided which is made of high-strength fine-grain structural steel and exhibits, at least in proximity of the rotor axis, the geometric shape of the sheets layered in the stack of laminations (2). With such a rotor, high speeds and a high operational safety can be ensured.

Fig. 2

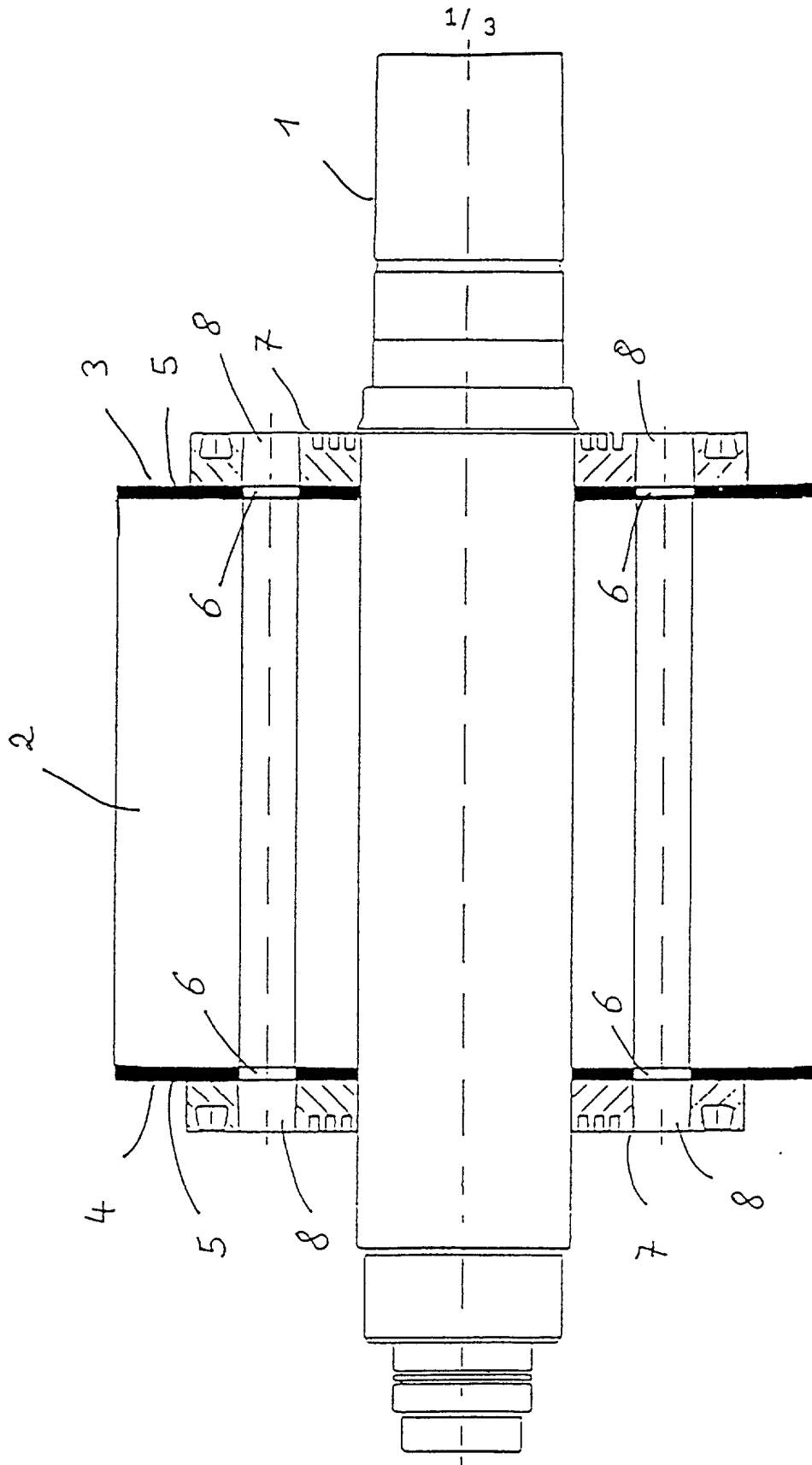


Fig. 1

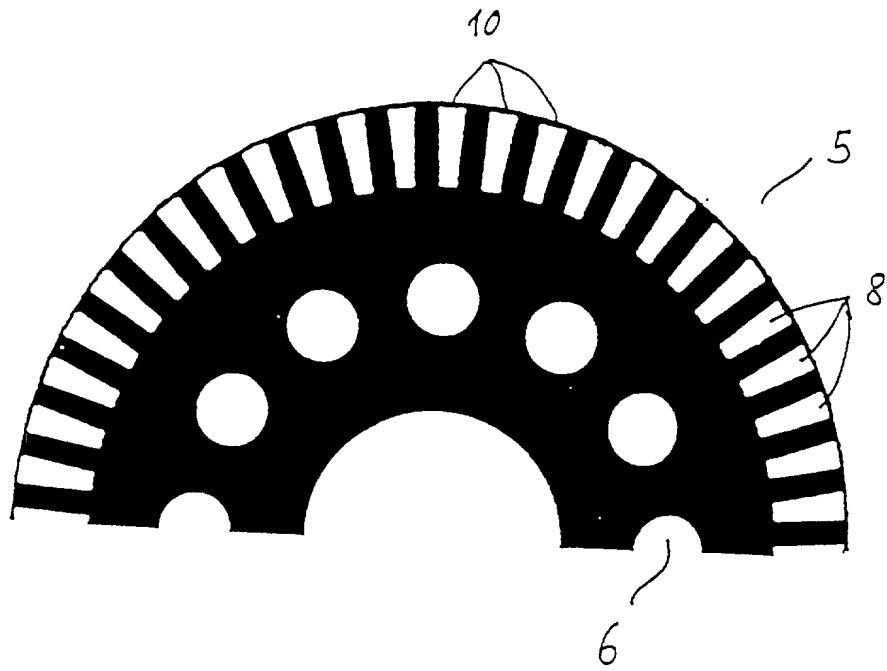


Fig. 2

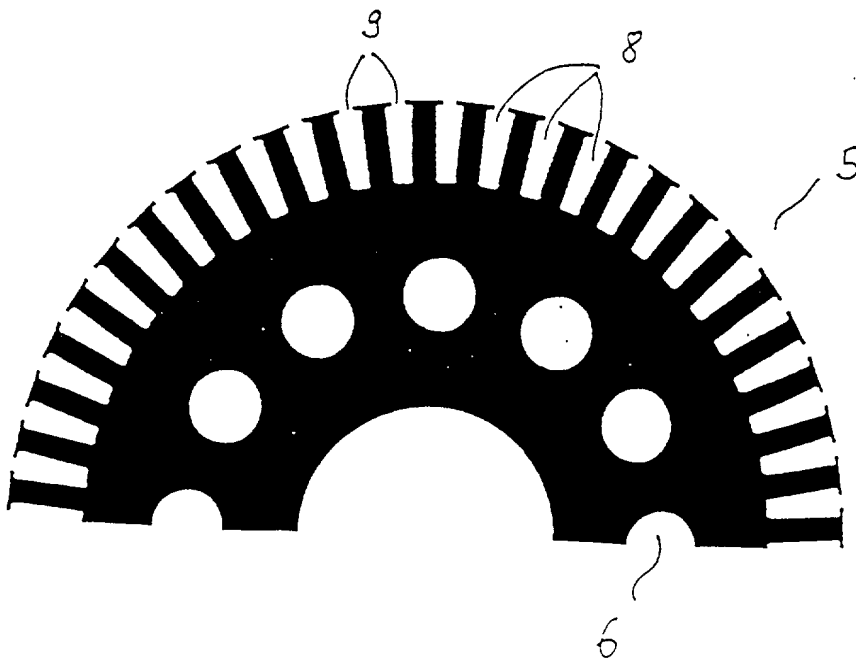


Fig. 3

3/3

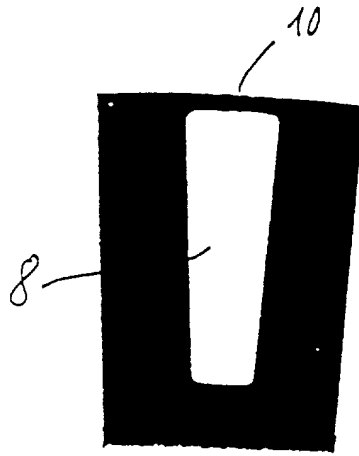


Fig. 5

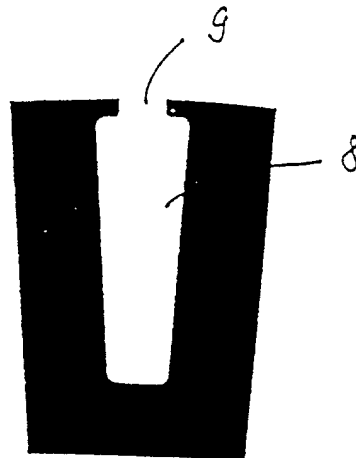


Fig. 4

Declaration and Power of Attorney for Patent Application
Erklärung für Patentanmeldungen mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

daß ich, nach bestem Wissen, der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

ELEKTROMOTOR

deren Beschreibung
(zutreffendes ankreuzen)

- ☐ hier beigelegt ist.
☒ wurde angemeldet am 16 Juni 1999
unter der U.S.-Anmeldungs Nr. oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT)
PCT/DE99/01772 und am
_____ abgeändert (falls zutreffend).

Ich bestätige hiermit, daß ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag, wie oben erwähnt, abgeändert wurde

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen an, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Titel 37, Code of Federal Regulations, §1.56 von Belang sind.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Titel 35, US-Code, §119(a)-(d), bzw. §365(b) aller unten angegebenen Auslandsanmeldungen für ein Patent oder Erfinderurkunden, oder §365(a) aller PCT internationalen Anmeldungen, welche wenigstens ein Land ausser den Vereinigten Staaten von Amerika benennen, und habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen für Patente oder Erfinderurkunden oder PCT internationale Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung, für welche Priorität beansprucht wird, vorangeht.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

ELEKTROMOTOR

the specification of which
(check one)

- ☐ is attached hereto
☒ was filed on 16 June 1999
as United States Application Number or PCT International Application Number
PCT/DE99/01772 and _____ was amended on _____
(if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

Priority Claimed?
Priorität beansprucht?

198 29 053.5 Germany 29/June/1998
(Number) (Country) (Day/Month/Year Filed)
(Nummer) (Land) (Tag/Monat/Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number) (Country) (Day/Month/Year Filed)
(Nummer) (Land) (Tag/Monat/Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Titel 35, US-Code, §119(e), den Vorzug aller unten aufgeführten US-Hilfsanmeldungen

I hereby claim the benefit under Title 35, United States Code, §119(c) of any United States provisional application(s) below

(Application No. / Anmeldendr.)

(Filing Date / Anmeldedatum)

(Application No. / Anmeldendr.)

(Filing Date / Anmeldedatum)

Ich beanspruche hiermit gemäss Titel 35, US-Code, §120, den Vorzug aller unten aufgeführten US-Patentanmeldungen bzw. §365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung, bzw. PCT internationalen Anmeldung in einer gemäß dem ersten Absatz von Titel 35, US-Code §112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, §1.56 von Belang sind und im Zeitraum zwischen dem Anmeldedatum der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldedatum bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Appl. No.)
(Anmeldendr.)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig
aufgegeben)

(Status)
(patented, pending
abandoned)

(Appl. No.)
(Anmeldendr.)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig
aufgegeben)

(Status)
(patented, pending
abandoned)

Ich erkläre hiermit, daß alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und daß ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, daß wissentlich und vorsätzlich falsche Angaben gemäss §. 1001, Titel 18 US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können, und daß derartig wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Vertreter mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem US-Patent- und Warenzeichenamt:

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

HENRY M. FEIEREISEN
Reg. No. 31,084

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(Name und Telefonnummer)

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Send Correspondence to:



020151

PATENT 006111 MARK OFFICE

Voller Name des einzigen oder
ursprünglichen Erfinders

Full name of first inventor

ERNST WELLISCH

Unterschrift des Erfinders

Datum

Inventor's Signature

Date

Ernst Wellisch 2000.12.11

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